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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No. 35.C13969

First Named Inventor or Application Identifier

JUN HORIYAMA

Express Mail Label No.

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO:

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☐ Fee Transmittal Form
(Submit an original, and a duplicate for fee processing)

2. ☒ Specification Total Pages **40**

3. ☒ Drawing(s) (35 USC 113) Total Sheets **13**

4. ☒ Oath or Declaration Total Pages **1**

- a. ☐ Newly executed (original or copy)
b. ☒ Unexecuted for information purposes
c. ☐ Copy from a prior application (37 CFR 1.63(d))
(for continuation/divisional with Box 17 completed)
(Note Box 5 below)

i. ☐ **DELETION OF INVENTOR(S)**
Signed Statement attached deleting inventor(s)
named in the prior application, see 37 CFR
1.63(d)(2) and 1.33(b).

5. ☐ Incorporation By Reference (useable if Box 4c is checked)
The entire disclosure of the prior application, from which a copy of the
oath or declaration is supplied under Box 4c, is considered as being
part of the disclosure of the accompanying application and is hereby
incorporated by reference therein.

6. ☐ Microfiche Computer Program (Appendix)

7. Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)

- a. ☐ Computer Readable Copy
b. ☐ Paper Copy (identical to computer copy)
c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

8. ☐ Assignment Papers (cover sheet & document(s))
9. ☐ 37 CFR 3.73(b) Statement ☐ Power of Attorney
(when there is an assignee)
10. ☐ English Translation Document (if applicable)
11. ☐ Information Disclosure ☐ Copies of IDS
Statement (IDS)/PTO-1449 Citations
12. ☐ Preliminary Amendment
13. ☒ Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)
14. ☐ Small Entity ☐ Statement filed in prior application
Statement(s) Status still proper and desired
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17. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No. ___/___

18. CORRESPONDENCE ADDRESS

☒ Customer Number or Bar Code Label

05514
(Insert Customer No. or Attach bar code label here)

or ☐ Correspondence address below

NAME

Address

City

State

Zip Code

Country

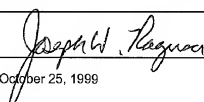
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CLAIMS	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
	TOTAL CLAIMS (37 CFR 1.16(c))	29-20 =	9	X \$ 18.00 =	\$162.00
	INDEPENDENT CLAIMS (37 cfr 1.16(b))	3-3 =	0	X \$ 78.00 =	\$ 0.00
	MULTIPLE DEPENDENT CLAIMS (if applicable) (37 CFR 1.16(d))			\$260.00 =	\$260.00
				BASIC FEE (37 CFR 1.16(a))	\$760.00
	Total of above Calculations =				\$1,182.00
	Reduction by 50% for filing by small entity (Note 37 CFR 1.9, 1.27, 1.28).				
	TOTAL =				\$1,182.00

19. Small entity status
- a. ☐ A Small entity statement is enclosed
- b. ☐ A small entity statement was filed in the prior nonprovisional application and such status is still proper and desired.
- c. ☐ Is no longer claimed.
20. ☒ A check in the amount of \$ 1,182.00 to cover the filing fee is enclosed.
21. ☐ A check in the amount of \$ _____ to cover the recordal fee is enclosed.
22. The Commissioner is hereby authorized to credit overpayments or charge the following fees to Deposit Account No. 06-1205:
- a. ☒ Fees required under 37 CFR 1.16.
- b. ☒ Fees required under 37 CFR 1.17.
- c. ☐ Fees required under 37 CFR 1.18.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED	
NAME	Joseph W. Ragusa (Reg. No. 38,586)
SIGNATURE	
DATE	October 25, 1999

PRINT SYSTEM, PRINTING METHOD,
AND STORAGE MEDIUM

BACKGROUND OF THE INVENTION

5 Field of the Invention

The invention relates to a print system, a printing method, and a storage medium, in which when font data is registered (downloaded) from a host computer to a printing apparatus such as a printer or the like and the downloaded font data is printed from a host computer connected to a network, a printing process or the like is performed by using the downloaded font data held in the printing apparatus.

Related Background Art

15 In recent years, there has been realized an environment called WYSIWYG (What You See Is What You Get) such that a host computer has therein a function to form font data and font data according to each resolution is formed and sent to a display and a printing apparatus such as a printer, thereby allowing the printing apparatus to print by the same design as characters which are displayed on the display.

25 In such a printing environment, it is necessary to send the font data to the printing apparatus. However, since it takes time to process if the font data is sent as mentioned above, in recent years, the font data is previously registered (downloaded) into an external

memory such as a hard disk (HD) or the like annexed to the printing apparatus and a high speed of the printing process is realized by using the downloaded data.

On the other hand, in the case where a plurality of users use the printing apparatus in common through a network such as LAN or the like, there is provided an environment such that when the printing process is performed by using the font data which was downloaded into an external memory such as a hard disk or the like annexed to the printing apparatus, only a host computer which downloaded the font data can use such data, or an environment such that after information such as font data downloaded in the printing apparatus was confirmed, it can be directly used from each host computer via the network.

In the above conventional print environment, however, there are the following problems and it is demanded to improve it. That is, in an environment such that only the host computer which downloaded the font data can use it or an environment such that after the font data downloaded in the printing apparatus was confirmed, it can be directly used from each host computer via the network, in case of a print system in which a plurality of host computers and printing apparatuses are connected, it is difficult to recognize into which printing apparatus which font data has been downloaded.

SUMMARY OF THE INVENTION

It is, therefore, an object of the invention to provide a print system, a printing method, and a storage medium, in which in the case where information regarding printing apparatuses and information regarding font data are managed by a host computer, a server computer, or the like and outputted from the host computer connected to the same network to the printing apparatus, by enabling the downloaded information to be easily confirmed and enabling the font data downloaded in each printing apparatus to be used in common, a printing efficiency can be remarkably improved.

To accomplish the above object, according to the invention, there is provided a print system in which at least one host computer and one printing apparatus are connected and font data from the host computer is registered into a memory of the printing apparatus, and a printing process is performed by using the registered font data, comprising: transfer means for, when the font data is registered from the host computer into the memory of the printing apparatus, sending the font data and font registration information regarding the printing apparatus to at least one of the other host computer and the memory of the printing apparatus; referring means for referring to the sent font registration information in the case where the host

computer prints by using the printing apparatus;
discriminating means for discriminating whether a
printing apparatus name and a font name which are
required by the host computer to print by using the
5 printing apparatus exist in the referred font
registration information or not; and printing means
for, when it is determined that they exist, performing
the printing process by using the font data registered
in the memory of the printing apparatus.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram showing a construction
of a print system according to the first embodiment;

Fig. 2 is a diagram showing a memory map in an RAM

2;

Fig. 3 is a flowchart showing a font download
processing procedure;

Figs. 4A, 4B and 4C are diagrams showing contents
of font download management information;

Fig. 5 is a flowchart showing a print processing
procedure for actually downloading font data in the
case where a print command is issued from a host
computer to a printing apparatus connected to a
network;

Fig. 6 is a flowchart showing a deletion
processing procedure of downloaded font data;

Fig. 7 is a flowchart showing a font download

processing procedure in the second embodiment;

Fig. 8 is a flowchart showing a print processing
procedure for actually downloading font data in the
case where a print command is issued from a host
5 computer to a printing apparatus which is connected
through a network such as LAN or the like or directly;

Fig. 9 is a flowchart showing a processing
procedure for deleting downloaded font data;

Fig. 10 is a flowchart showing a font download
10 processing procedure in the third embodiment;

Fig. 11 is a flowchart showing a print processing
procedure for actually downloading font data in the
case where a print command is issued from a host
computer to a printing apparatus which is connected
15 through a network such as LAN or the like or directly;

Fig. 12 is a flowchart showing a processing
procedure for deleting downloaded font data; and

Fig. 13 is a diagram showing a memory map in an
ROM 3 as a storage medium.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

An embodiment of a print system, a printing
method, and a storage medium of the invention will now
be described. The print system of the embodiment is
25 applied to a print system in which a host computer, a
server computer, and a printing apparatus are connected
through a network.

[First embodiment]

Fig. 1 is a block diagram showing a construction of a print system in the first embodiment. In the diagram, reference numeral 1000 denotes a host computer having a CPU 1 for executing a document processing program or the like stored in a program ROM of an ROM 3 or an external memory 11 and processing a document in which a figure, an image, characters, a table (including a spreadsheet or the like), and the like mixedly exist. The CPU 1 integratedly controls each device connected to a system bus 4.

An operating system program (OS) or the like as a control program of the CPU 1 is stored in the program ROM of the ROM 3 or the external memory 11. Font data or the like which is used in a document process is stored in a font ROM of the ROM 3 or the external memory 11. Various data which is used when the document process or the like is performed is stored in a data ROM of the ROM 3.

Reference numeral 2 denotes an RAM which functions as a main memory, a work area, or the like of the CPU 1; 5 a keyboard controller (KBC) for controlling a key input from a keyboard (KB) 9 or a pointing device (not shown); and 6 a CRT controller (CRTC) for controlling a display of a CRT display (CRT) 10.

Reference numeral 7 denotes a disk controller (DKC) for controlling an access to the external memory

11 such as hard disk (HD), floppy disk (FD), or the
like for storing a boot program, various applications,
font data, a user file, an edition file, a character
image data forming program (font rasterizer), a printer
5 control command forming program (printer driver), and
the like.

Reference numeral 8 denotes a printer controller
(PRTC) which is connected to a printer (not shown)
through a bidirectional interface (interface) and
10 executes a communication control process of a
communication with the connected printer. In the
embodiment, the PRTC 8 executes a communication control
process of a communication with a printer 2000 or
another computer connected to a network 4000 such as
15 LAN or the like through a bidirectional interface 3001
from a network controller (NETC) 100.

The CPU 1 executes a developing (rasterizing)
process of an outline font into, for example, a display
information RAM set on the RAM 2, thereby enabling
20 WYSIWYG on the CRT 10. The CPU 1 opens various
registered windows on the basis of a command instructed
by a mouse cursor (not shown) or the like on the CRT 10
and executes various data processes.

A server computer 3000 is constructed in a manner
25 similar to the host computer 1000 and manages the host
computer 1000 and printer 2000 connected to the network
4000. Although only one host computer and one printer

are shown in Fig. 1, a plurality of host computers 1000 and printers 2000 can be connected to the network 4000.

In the printer 2000, reference numeral 12 denotes a printer CPU for generating an image signal as output
5 information to a printing section (printer engine) 17 connected to a system bus 15 on the basis of a control program stored in the program ROM of the ROM 13, a control program stored in a external memory 14, or the like.

10 The control program or the like of the CPU 12 is stored in a program ROM of the ROM 13. Font data which is used when output information is formed is stored in a font ROM of the ROM 13. Particularly, in case of a printer without the external memory 14 such as a hard
15 disk, information or the like which is used on the host computer is stored in a data ROM of the ROM 13.

The CPU 12 can communicate with the host computer 1000 through an input section 18 and the bidirectional interface 3001 and notify the host computer 1000 of
20 information or the like in the printer. In the embodiment, the CPU 12 can communicate with the host computer 1000, another computer, another printer, or the like connected to the network 4000 such as LAN or the like from the input section 18 through the
25 bidirectional interface 3001.

Reference numeral 19 denotes an RAM which functions as a main memory, a work area, or the like of

the CPU 12 and is constructed so that a memory capacity can be expanded by an option RAM which is connected to an expanding port (not shown). The RAM 19 is used as an output information developing area, an environment data storing area, an NVRAM, or the like. An access to the external memory 14 such as hard disk (HD), IC card, or the like mentioned above is controlled by a memory controller (MC) 202. The external memory 14 is connected as an option and stores font data, an emulation program, form data, and the like. Operation switches, an LED display, and the like are arranged on an operation panel 201.

The number of external memories mentioned above is not limited to 1 but the system has at least one or more external memories. The printer 2000 is constructed such that a plurality of option font cards as well as built-in fonts and a plurality of external memories in each of which a program to interpret printer control languages of different language systems has been stored can be connected.

Any of a floppy disk (FD), an optical disk, a magnetooptic disk, a magnetic tape, a flash memory, a non-volatile memory such as an NVRAM, a static RAM which is backed up by a battery, and the like is used as a storage medium of the external memory. Printer mode set information can be stored from the operation panel 201 to the storage medium such as an NVRAM or the

like mentioned above.

Fig. 2 is a diagram showing a memory map in the RAM 2. In the diagram, reference numeral 20 denotes a basic I/O program; 21 a state where the operating system such as a Windows system has been loaded into the RAM 2 and can be executed; 22 a state where application programs of the embodiment have been loaded into the RAM 2 and can be executed; 23 a state where the associated data has been loaded in the RAM 2; and 24 a work area which is used by each program.

The print processing operation of the print system having the above construction will now be described. Fig. 3 is a flowchart showing a font data download processing procedure. This processing program has been stored in the program ROM of the ROM 3. After this processing program was loaded into the RAM 2, it is executed by the CPU 1.

First, information of the printing apparatus such as printer, image setter, or the like to be downloaded is obtained from the operating system (OS) or application on the host computer which controls a download program (step S301).

Whether there is a printer into which the font data can be downloaded or not is discriminated (step S302) on the basis of the information of the printer obtained in step S301. If the printer in which the font data can be downloaded does not exist, the

processing routine is finished. If it exists, the printer to which the font data is downloaded is selected (step S303).

Information of the font data is obtained from the
5 operating system (OS) or application on the host computer (step S304). On the basis of the information of the font data obtained in step S304, whether there is font data which can be downloaded or not is discriminated (step S305).

10 If the downloadable font data does not exist, the processing routine is finished. If it exists, the font data to be downloaded is selected (step S306).

Font download information held in a font download management table of the server computer 3000 to manage
15 the host computer 1000, printer 2000, and the like connected to the network 4000 such as LAN or the like is referred to by the host computer 1000 via the network (step S307).

Figs. 4A to 4C are diagrams showing contents of
20 the font download information. Fig. 4A shows the contents of the font download information stored in the font download management table of the server computer 3000 with respect to the font data which has already been downloaded. This information comprises a "printer name" and a "font name". For example, it is shown that
25 font data of font names of "Ming type A" and "Gothic A" has been downloaded in the printer shown by a printer

name "LBP-1".

On the basis of the information referred to as mentioned above, a check is made to see if the font download information comprising a combination of two
5 data of the "printer name" selected in step S303 and the "font data" selected in step S306 exists in the font download management table (step S308).

If it already exists, the processing routine is finished. If it does not exist, the font data is
10 downloaded from the host computer 1000 into the external memory 14 such as an HD or the like of the printer 2000 (step S309). Further, the font download information is formed and sent to the server computer 3000 (step S310) and the processing routine is
15 finished.

Figs. 4B and 4C show contents of the font download information at this time. First, Fig. 4B shows that the "printer name" selected in step S303 is "LBP-1" and the "font name" selected in step S306 is "Cursive type
20 A". Since the font download information showing such a combination does not exist in the font download management table (Fig. 4A), a downloading process in step S309 is performed. The font download information shown in Fig. 4B is formed and sent in step S310. The
25 information is added into the font download management table as shown in Fig. 4C.

Fig. 5 is a flowchart showing a print processing

procedure for actually downloading font data in the case where a print command is issued from the host computer to a certain printer connected to the network. This processing program has been stored in the program ROM of the ROM 3. After this processing program was loaded into the RAM 2, it is executed by the CPU 1. First, a check is made to see if the font download information showing a combination of the name of the printer and the name of font of the data to be printed exists in the font download management table in the server computer 3000 (step S501). If YES, the printing process is performed by using the font data which has already been downloaded in step S306 in Fig. 3 (step S506).

For example, if the print of the font data of the font name "Ming type B" is requested for the printer of the printer name "LBP-2" when the font download management table indicates the font download information in Fig. 4A, since the combination information already exists in the management table, namely, since this means that the font name "Ming type B" has already been downloaded in the printer shown by the printer name "LBP-2", the printing process is performed by using the downloaded font data in step S506.

When the combination information does not exist, whether such information is newly downloaded or not is

discriminated (step S502).

For example, if the print by the font data shown by the font name "Cursive type A" is requested to the printer shown by the printer name "LBP-1" as shown in Fig. 4B, since the information does not exist in the font download management table, whether the downloading process is performed or not is discriminated (step S502).

If it is determined that the downloading process is performed, the downloading process is executed (step S503). Thus, the font download information indicating that the font data shown by the font name "Cursive type A" was downloaded to the printer shown by the printer name "LBP-1" is added to the font download management table held in the server computer 3000 as shown in Fig. 4C (step S504). The printing process is performed by using the downloaded font data (step S506).

If it is decided in step S502 that the downloading process is not performed, the printing process is performed (step S505) by using the screen font existing in the host computer 1000 or by substituting another font data held by the printer 2000 for such a screen font and using such font data. The processing routine is finished.

Fig. 6 is a flowchart showing a deletion processing procedure of the downloaded font data. This processing program has been stored in the program ROM

of the ROM 3. After this processing program was loaded into the RAM 2, it is executed by the CPU 1. First, the font download management table held in the server computer 3000 is referred to (step S1001). The font
5 name and printer name to be deleted are selected (step S1002). On the basis of the selected contents, the font data held in the external memory 14 of the printer 2000 is deleted (step S1003). An entry selected in
10 step S1002 is deleted from the font download management table held in the server computer 3000 and updated (step S1004). After that, the processing routine is finished.

As mentioned above, according to the first embodiment, when data is outputted to the printer 2000
15 from the host computer 1000 connected to the network 4000, the font download information can be easily confirmed, the font data downloaded in each printer 2000 can be used in common and a printing efficiency can be remarkably improved. The font download
20 management table can be unitarily managed by the server computer 3000.

[Second embodiment]

In the second embodiment, since the system construction shown in Fig. 1 and the memory map shown
25 in Fig. 2 are substantially the same as those in the first embodiment, their description is omitted.

In the first embodiment, there has been mentioned

the method whereby the font download information for one or a plurality of printers on the network can be unitarily managed by reflecting the information about the printer and fonts which was downloaded by the host
5 computer to the font download management table existing on the server computer. In the second embodiment, however, there is shown a case where just after the font download management table on the server computer was updated, the font download management table is sent
10 to all of the host computers connected to the server computer through the network such as LAN or the like or directly.

Fig. 7 is a flowchart showing a font data download processing procedure in the second embodiment. This
15 processing program has been stored in the program ROM of the ROM 3. After this processing program was loaded into the RAM 2, it is executed by the CPU 1. First, information of a printing apparatus such as printer, image setter, or the like to be downloaded is obtained
20 from the operating system (OS) or application on the host computer to control the downloading program (step S601).

On the basis of the information of the printer obtained in step S601, whether there is a printer in
25 which the font data can be downloaded or not is discriminated (step S602). If the printer in which the font data can be downloaded does not exist, the

processing routine is finished. If it exists, the printer 2000 to which the font data is downloaded is selected (step S603).

5 The information of the font data is obtained from the operating system (OS) or application on the host computer 1000 (step S604). On the basis of the information of the font data obtained in step S604, whether there is downloadable font data or not is discriminated (step S605).

10 If the downloadable font data does not exist, the processing routine is finished. If it exists, the font data to be downloaded is selected (step S606).

15 The font download management table in the host computer is referred to (step S607). A check is made to see if the font download information comprising a combination of two data of the "printer name" selected in step S603 and the "font information" selected in step S606 exists in the font download management table (step S608). If it already exists, the processing
20 routine is finished. If it does not exist or if the font download management table itself does not exist, the font data is downloaded from the host computer 1000 to the external memory 14 such as an HD or the like in the printer 2000 (step S609).

25 Font download information is formed and sent to the server computer 3000 (step S610). After that, the font download management table is sent to all of the

host computers connected to the server computer 3000 through the network such as LAN or the like or directly (step S611). The processing routine is finished.

Fig. 8 is a flowchart showing a print processing procedure for actually downloading the font data in the case where the print command is issued from the host computer to the printer connected through the network such as LAN or the like or directly. This processing program has been stored in the program ROM of the ROM 3. After this processing program was loaded into the RAM 2, it is executed by the CPU 1.

First, the font download management table in the host computer is referred to (step S701). A check is made to see if the font download information comprising a combination of two data of the "printer name" and the "font information" exists in this table (step S702). If the font download information already exists, the printing process is performed by using the downloaded font data (step S708).

If the font download information does not exist or if the font download management table itself does not exist, a check is made to see if the font data is downloaded from the host computer 1000 into the external memory 14 such as an HD or the like in the printer 2000 (step S703). If it is not downloaded, the printing process is performed by using the screen font existing in the host computer 1000 or by substituting

another font data held in the printer 2000 for such a screen font and using such font data (step S707). The processing routine is finished.

5 In case of downloading it in step S703, the font data is downloaded from the host computer 1000 into the external memory 14 such as an HD of the printer 2000 (step S704). The font download information is sent to the server computer 3000 (step S705). After that, the font download management table is sent to all of the
10 host computers connected to the server computer 3000 through the network such as LAN or the like or directly (step S706). The printing process is performed by using the downloaded font data (step S708). The processing routine is finished.

15 Fig. 9 is a flowchart showing a processing procedure for deleting the downloaded font data. First, the font download management table is referred to (step S1101). The font name and printer name to be deleted are selected (step S1102). On the basis of the
20 selected contents, the font data held in the external memory 14 of the printer 2000 is deleted (step S1103). An entry selected in step S1102 is deleted from the font download management table held in the server computer 3000 and is updated (step S1104). The font
25 download management table updated in step S1104 is sent to the other host computer through the network such as LAN or the like (step S1105). The processing routine

is finished.

As mentioned above, according to the second embodiment, each host computer 1000 connected to the network can manage the font download information and easily refer to it. The font download management tables in the server computer 3000 and in the host computer 1000 can be always updated to the latest tables and maintained.

[Third embodiment]

In the third embodiment, since the system construction shown in Fig. 1 and the memory map shown in Fig. 2 are similar to those in the first embodiment, their description is omitted here.

In the third embodiment, the font download management table is held in the external memory such as an HD or the like annexed to the printer and updated each time the font data is downloaded from the host computer connected to the printer through the network such as LAN or the like or directly. There is shown a case of grasping a download situation by sending the font download management table to all of the host computers connected to the printer via the server computer just after the updating of the table.

Fig. 10 is a flowchart showing a font data download processing procedure in the third embodiment. This processing program has been stored in the program ROM of the ROM 3. After this processing program was

loaded into the RAM 2, it is executed by the CPU 1.

First, the information of the printing apparatus
such as printer, image setter, or the like to be
downloaded is obtained from the operating system (OS)
5 or application on the host computer to control the
downloading program (step S801).

On the basis of the information of the printer
obtained in step S801, whether there is a printer in
which the font data can be downloaded or not is
10 discriminated (step S802). If the printer in which the
font data can be downloaded does not exist, the
processing routine is finished. If it exists, the
printer 2000 to which the font data is downloaded is
selected (step S803). The information of the font data
15 is obtained from the operating system (OS) or
application on the host computer 1000 (step S804).

On the basis of the information of the font data
obtained in step S804, whether the downloadable font
data exists or not is discriminated (step S805). If
20 the downloadable font data does not exist, the
processing routine is finished. If it exists, the font
data to be downloaded is selected (step S806).

The font download management table in the host
computer is referred to (step S807). A check is made
25 to see if the font download information comprising a
combination of two data of the "printer name" selected
in step S803 and the "font information" selected in

step S806 exists in the table (step S808). If such font download information already exists, the processing routine is finished. If it does not exist or if the font download management table itself does not exist, the font data is downloaded from the host computer 1000 into the external memory 14 such as an HD or the like of the printer 2000 (step S809).

The font download information is sent to the external memory 14 such as an HD or the like annexed to the printer 2000 (step S810). After that, the font download management table is sent to all of the host computers connected to the server computer 3000 through the network such as LAN or the like or directly (step S811). The processing routine is finished.

Fig. 11 is a flowchart showing a print processing procedure for actually downloading the font data in the case where the print command is issued from the host computer to the printer connected through the network such as LAN or the like or directly. This processing program has been stored in the program ROM of the ROM 3. After this processing program was loaded into the RAM 2, it is executed by the CPU 1.

First, the font download management table in the host computer is referred to (step S901). A check is made to see if the font download information comprising a combination of two data of the "printer name" and the "font information" exists in this table (step S902).

If it already exists, the printing process is performed by using the downloaded font data (step S908). The processing procedure is finished.

5 If it does not exist or if the font download management table itself does not exist, a check is made to see if the font data is downloaded from the host computer 1000 to the external memory 14 such as an HD or the like of the printer 2000 (step S903). If the font data is not downloaded, the printing process is
10 performed (step S907) by using the screen font existing in the host computer 1000 or by substituting another font data held by the printer 2000 for such a screen font and using such font data. The processing routine is finished.

15 In case of downloading in step S903, the font data is downloaded from the host computer 1000 to the external memory 14 such as an HD or the like of the printer 2000 (step S904). The font download management table is sent to the external memory 14 such as an HD
20 or the like annexed to the printer 2000 (step S905). After that, the font download management table is sent to all of the host computers connected to the printer 2000 through the network such as LAN or the like or directly (step S906). After that, the printing process
25 is performed by using the downloaded font data in step S908. The processing routine is finished.

Fig. 12 is a flowchart showing a processing

procedure for deleting the downloaded font data.

First, the font download management table is referred to (step S1201). The font name and printer name to be deleted are selected (step S1202). The font data held
5 in the external memory 14 of the printer 2000 is deleted on the basis of the selected contents (step S1203). The entry selected in step S1202 is deleted from the font download management table held in the external memory 14 such as an HD annexed to the printer
10 2000 and is updated (step S1204). The font download management table updated in step S1204 is sent to the other host computer through the network such as LAN (step S1205). The processing routine is finished.

As mentioned above, in the third embodiment, the
15 font download information can be managed without using the server computer 3000. The font download management tables in the external memory 14 of the printer 2000 and in the host computer 1000 can be always updated to the latest tables and maintained.

The invention shown in the first to third
20 embodiments can be applied to a system constructed by a plurality of equipment or can be applied to an apparatus comprising one equipment. The invention can be applied to a case where it is accomplished by
25 supplying a program to a system or apparatus. In this case, a program shown by software to accomplish the invention is stored into a storage medium and read out

therefrom and installed into the system or apparatus, so that the system or apparatus can obtain the effects of the invention.

Fig. 13 is a diagram showing the memory map in the ROM 3 as a storage medium. A font data download processing module shown in Figs. 3, 7, and 10, a print processing module shown in Figs. 5, 8, and 11, and a font data deletion processing module shown in Figs. 6, 9, and 12 have been stored in the ROM 3.

10 The storage medium is not limited to the ROM but it is possible to use any of, for example, a floppy disk, a hard disk, an optical disk, a magnetooptic disk, a CD-ROM, a CD-R, a DVD, a magnetic tape, a non-volatile memory card, and the like.

15 Further, the invention also incorporates a case where program codes read out from the storage medium are written into a memory equipped for a function expanding board inserted in a computer or a function expanding unit connected to the computer, and after
20 that, a CPU or the like equipped for the function expanding board or function expanding unit executes a part or all of the actual processes on the basis of instructions of the program codes, and the functions of the foregoing embodiments are realized by those
25 processes.

According to the print system of the invention, there is provided the print system in which at least

one host computer and printer are connected, in the case where the font data is registered from the host computer into the memory of the printer and the printing process is performed by using the registered font data, when the font data is registered from the host computer into the memory of the printer, the font data and the font registration information regarding the printer are sent to at least one of the other host computer and the memory of the printer by the transfer means, and in the case where the host computer prints by using the printer, the sent font registration information is referred to by the referring means, whether the printer name and font name which are required from the host computer to print by using the printer exist in the font registration information referred to or not is discriminated by the discriminating means, and when it is determined that they exist, the printing process is performed by the printing means by using the font data registered in the memory of the printer, so that in the case where the information regarding the printer and the font registration information such as information regarding the font data or the like are managed by at least one of the other host computer and the memory of the printer, and outputted from the host computer connected to the same network to the printer, the download information can be easily confirmed, and font data

downloaded to the printers can be used in common, so that the printing efficiency can be remarkably improved.

According to the print system of the invention,
5 the server computer to manage the network to which the host computers and printers are connected is included as another host computer, the transfer means sends the font registration information to the server computer, and the referring means refers to the font registration
10 information sent to the server computer, so that the font data and the font registration information regarding the printer can be unitarily managed by the server computer.

According to the print system of the invention, in
15 case of deleting the font data which has already been registered in the memory of the printer from the host computer, since the font registration information sent to the server computer is updated by the updating means, the font registration information unitarily
20 managed by the server computer can be always updated to the latest information and maintained.

According to the print system of the invention,
the server computer to manage the network to which the host computers and printers are connected is included
25 as another host computer, the transfer means sends the font registration information to the other host computer including the server computer, and the

referring means refers to the font registration information sent into the host computer to perform the printing process, so that each of the host computers connected to the network can manage the font registration information and easily refer to it.

According to the print system of the invention, in case of deleting the font data which has already been registered in the memory of the printer from the host computer, since the font registration information sent to the other host computer including the server computer is updated by the updating means, the font registration information in the server computer and the host computer can be always updated to the latest information and can be maintained.

According to the print system of the invention, the transfer means sends the font registration information to the memory of the printer and the other host computer and the referring means refers to the font registration information sent to the host computer to perform the printing process, so that the font registration information can be managed without using the server computer.

According to the print system of the invention, in case of deleting the font data which has already been registered in the memory of the printer from the host computer, since the font registration information sent to the memory of the printer and the other host

computer is updated by the updating means, the font registration information in the memory of the printer and in the host computer can be always updated to the latest information and maintained.

5 According to the print system of the invention, since the memory of the printer is the external memory annexed to the printer, when an amount of font data increases, it is possible to easily cope with such a situation by expanding an external memory.

10 According to the print system of the invention, since the host computer and the printer are connected through the network, the print system comprising a plurality of host computers and printers can be easily constructed.

15 According to the invention, there is provided the storage medium which stores a program that is executed by a CPU in a print system in which at least one host computer and one printer are connected and is provided for registering the font data from the host computer
20 into the memory of the printer and executing a printing process by using the registered font data, wherein the program comprises the steps of: when the font data is registered from the host computer into the memory of the printer, sending the font data and the font
25 registration information regarding the printer to at least one of the other host computer and the memory of the printer; referring to the sent font registration

information in the case where the host computer prints
by using the printer; discriminating whether the
printer name and font name which are required by the
host computer to print by using the printer exist in
5 the referred font registration information or not; and
performing the printing process by using the font data
registered in the memory of the printer when it is
determined that they exist. Therefore, the storage
medium having excellent expandability and generality of
10 the print system can be provided.

According to the invention, the font registration
information is sent to the memory of the printer and
the other host computer, and in the referring step, the
font registration information sent into the host
15 computer to perform the printing process is referred
to.

According to the invention, the program further
comprises the step of, in case of deleting the font
data which has already been registered in the memory of
20 the printer from the host computer, updating the font
registration information sent to the memory of the
printer and the other host computer.

WHAT IS CLAIMED IS:

1. A print system in which at least one host computer and one printing apparatus are connected and font data from said host computer is registered into a memory of said printing apparatus, and a printing process is performed by using said registered font data, comprising:

transfer means for, when said font data is registered from said host computer into the memory of said printing apparatus, sending said font data and font registration information regarding said printing apparatus to at least one of the other host computer and the memory of said printing apparatus;

referring means for referring to said sent font registration information in the case where said host computer prints by using said printing apparatus;

discriminating means for discriminating whether a printing apparatus name and a font name which are required by the host computer to print by using said printing apparatus exist in said referred font registration information or not; and

printing means for, when it is determined that they exist, performing the printing process by using the font data registered in the memory of said printing apparatus.

2. A system according to claim 1, wherein

a server computer to manage a network to which
host computers and printing apparatuses are connected
is included as said other host computer,

said transfer means sends said font registration
5 information to said server computer, and

said referring means refers to said font
registration information sent to said server computer.

3. A system according to claim 2, further
10 comprising updating means for updating the font
registration information sent to said server computer
in case of deleting the font data which has already
been registered in the memory of said printing
apparatus from said host computer.

15 4. A system according to claim 1, wherein
a server computer to manage a network to which
host computers and printing apparatuses are connected
is included as said other host computer,
20 said transfer means sends said font registration
information to the other host computer including said
server computer, and

said referring means refers to said font
registration information sent to the host computer to
25 perform the printing process.

5. A system according to claim 4, further

comprising updating means for updating the font registration information sent to the other host computer including said server computer in case of deleting the font data which has already been
5 registered in the memory of said printing apparatus from said host computer.

6. A system according to claim 1, wherein
said transfer means sends said font registration
10 information to the memory of said printing apparatus and said other host computer, and
said referring means refers to the font registration information sent to the host computer to perform the printing process.

15
7. A system according to claim 6, further comprising updating means for updating the font registration information sent to the memory of said printing apparatus and said other host computer in case
20 of deleting the font data which has already been registered in the memory of said printing apparatus from said host computer.

8. A system according to any one of claims 1 to
25 7, wherein the memory of said printing apparatus is an external memory annexed to said printing apparatus.

9. A system according to claim 1, wherein said host computer and said printing apparatus are connected through a network.

5 10. A printing method in a print system in which at least one host computer and one printing apparatus are connected, whereby font data is registered from said host computer into a memory of said printing apparatus and a printing process is performed by using
10 said registered font data, comprising the steps of:
 when said font data is registered from said host computer into the memory of said printing apparatus, sending said font data and font registration information regarding said printing apparatus to at
15 least one of the other host computer and the memory of said printing apparatus;
 referring to said sent font registration information in the case where said host computer prints by using said printing apparatus;
20 discriminating whether a printing apparatus name and a font name which are required by the host computer to print by using said printing apparatus exist in said referred font registration information or not; and
 when it is determined that they exist, performing
25 the printing process by using the font data registered in the memory of said printing apparatus.

11. A method according to claim 10, wherein
in said sending step, said font registration
information is sent to a server computer to manage a
network to which host computers and printing
5 apparatuses are connected, and

in said referring step, said font registration
information sent to said server computer is referred
to.

10 12. A method according to claim 11, further
comprising the step of updating the font registration
information sent to said server computer in case of
deleting the font data which has already been
registered in the memory of said printing apparatus
15 from said host computer.

13. A method according to claim 10, wherein
in said sending step, said font registration
information is sent to the other host computer
20 including a server computer to manage a network to
which host computers and printing apparatuses are
connected, and

in said referring step, said font registration
information sent to the host computer to perform the
25 printing process is referred to.

14. A method according to claim 13, further

comprising the step of updating the font registration information sent to the other host computer including said server computer in case of deleting the font data which has already been registered in the memory of said printing apparatus from said host computer.

15. A method according to claim 10, wherein in said sending step, said font registration information is sent to the memory of said printing apparatus and said other host computer, and in said referring step, the font registration information sent to the host computer to perform the printing process is referred to.

16. A method according to claim 15, further comprising the step of updating the font registration information sent to the memory of said printing apparatus and said other host computer in case of deleting the font data which has already been registered in the memory of said printing apparatus from said host computer.

17. A computer-readable storage medium which stores a program that is executed by a CPU in a print system in which at least one host computer and one printing apparatus are connected and is provided for registering font data from said host computer into a

memory of said printing apparatus and performing a printing process by using said registered font data,

wherein said program comprises the steps of:

when said font data is registered from said host
5 computer into the memory of said printing apparatus,
sending said font data and font registration
information regarding said printing apparatus to at
least one of the other host computer and the memory of
said printing apparatus;

10 referring to said sent font registration
information in the case where said host computer prints
by using said printing apparatus;

discriminating whether a printing apparatus name
and a font name which are required by the host computer
15 to print by using said printing apparatus exist in said
referred font registration information or not; and

when it is determined that they exist, performing
the printing process by using the font data registered
in the memory of said printing apparatus.

20

18. A medium according to claim 17, wherein
in said sending step, said font registration
information is sent to a server computer to manage a
network to which host computers and printing

25 apparatuses are connected, and

in said referring step, said font registration
information sent to said server computer is referred

to.

19. A medium according to claim 18, wherein said
program further comprises the step of updating the font
5 registration information sent to said server computer
in case of deleting the font data which has already
been registered in the memory of said printing
apparatus from said host computer.

10 20. A medium according to claim 17, wherein
in said sending step, said font registration
information is sent to the other host computer
including a server computer to manage a network to
which host computers and printing apparatuses are
15 connected, and

in said referring step, said font registration
information sent to the host computer to perform the
printing process is referred to.

20 21. A medium according to claim 20, wherein said
program further comprises the step of updating the font
registration information sent to the other host
computer including said server computer in case of
deleting the font data which has already been
25 registered in the memory of said printing apparatus
from said host computer.

22. A medium according to claim 17, wherein
in said sending step, said font registration
information is sent to the memory of said printing
apparatus and said other host computer, and
5 in said referring step, the font registration
information sent to the host computer to perform the
printing process is referred to.

23. A medium according to claim 22, wherein said
10 program further comprises the step of updating the font
registration information sent to the memory of said
printing apparatus and said other host computer in case
of deleting the font data which has already been
registered in the memory of said printing apparatus
15 from said host computer.

ABSTRACT OF THE DISCLOSURE

In a system in which a plurality of computers and
printers are connected, when a font of a document to be
printed does not exist in the printer, the font is
5 downloaded to the printer and a fact that it was
downloaded is also notified to the other computers.

10

15

FIG. 1

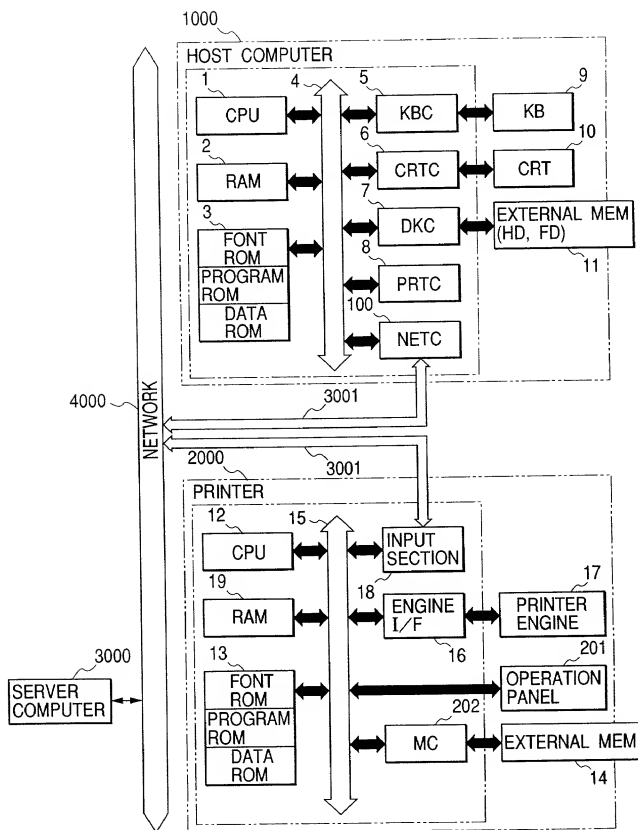


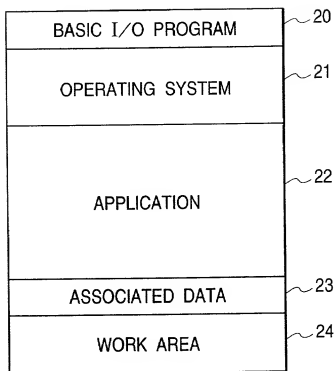
FIG. 2

FIG. 3

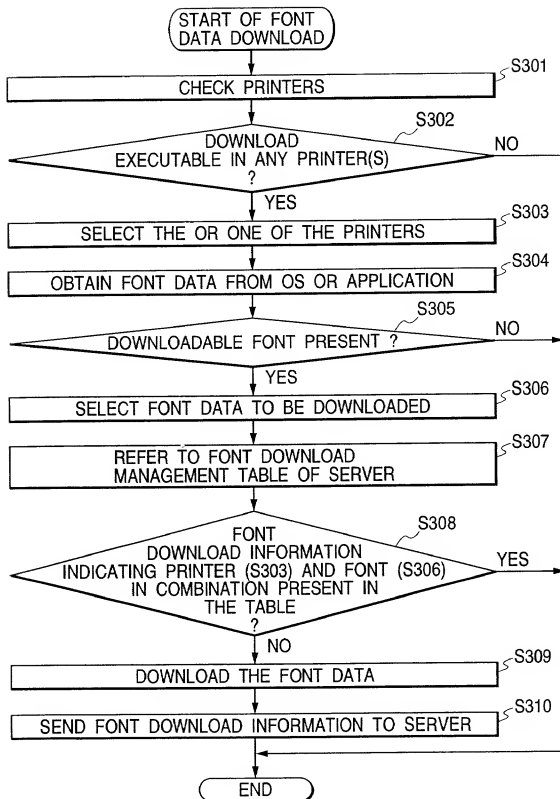


FIG. 4A

PRINTER NAME	FONT NAME
LBP-1	MING TYPE A
LBP-1	GOTHIC A
LBP-2	MING TYPE B
LBP-3	SCHOOL TEXT TYPE A

FIG. 4B

PRINTER NAME	FONT NAME
LBP-1	CURSIVE TYPE A

FIG. 4C

PRINTER NAME	FONT NAME
LBP-1	MING TYPE A
LBP-1	GOTHIC A
LBP-1	CURSIVE TYPE A
LBP-2	MING TYPE B
LBP-3	SCHOOL TEXT TYPE A

FIG. 5

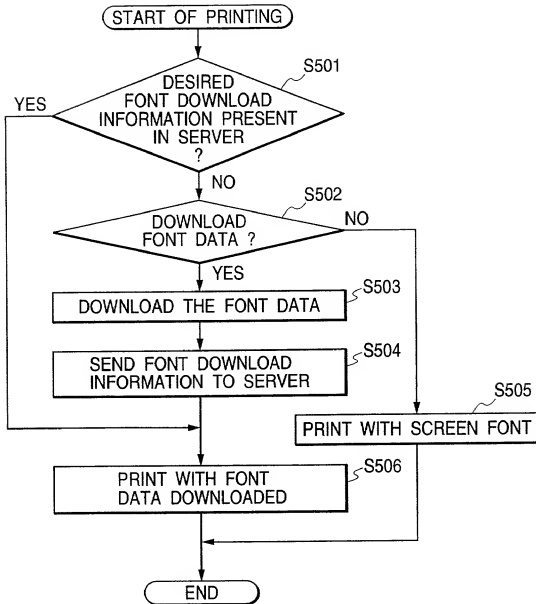


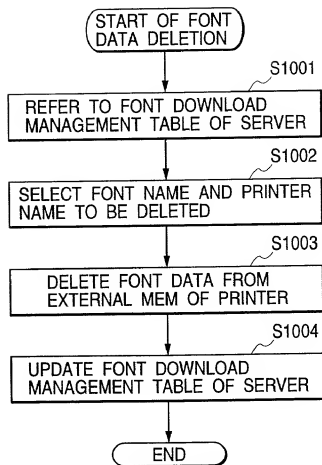
FIG. 6

FIG. 7

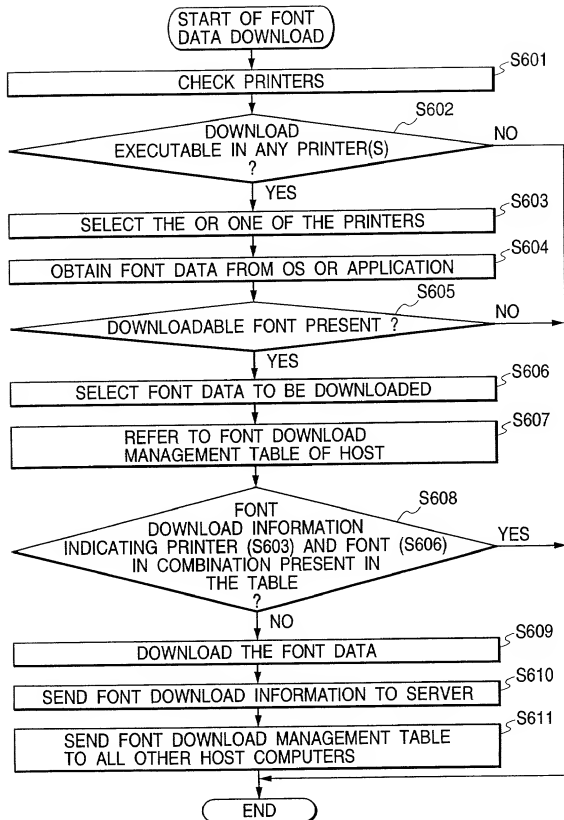


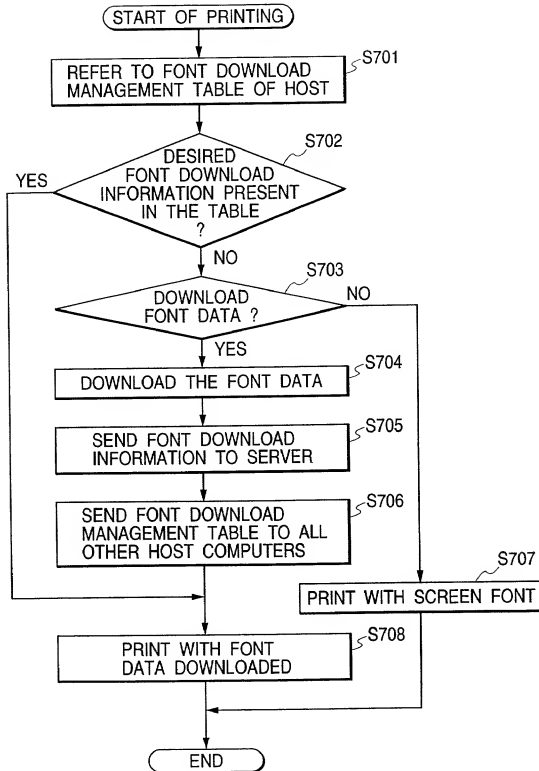
FIG. 8

FIG. 9

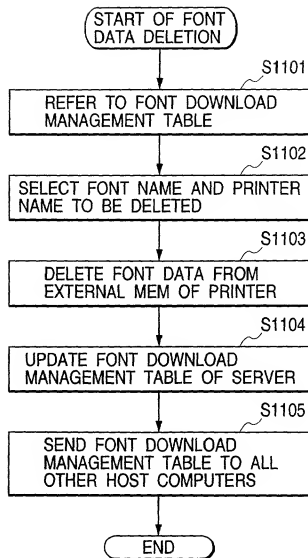


FIG. 10

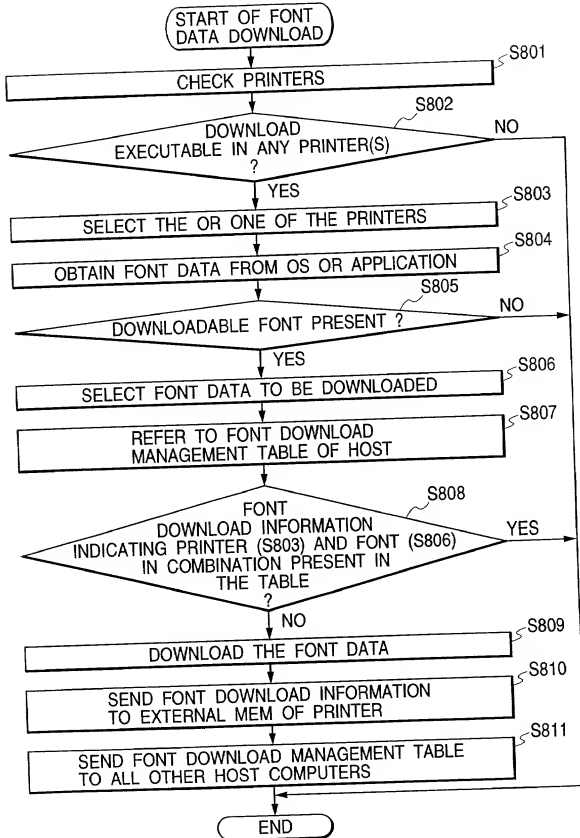


FIG. 11

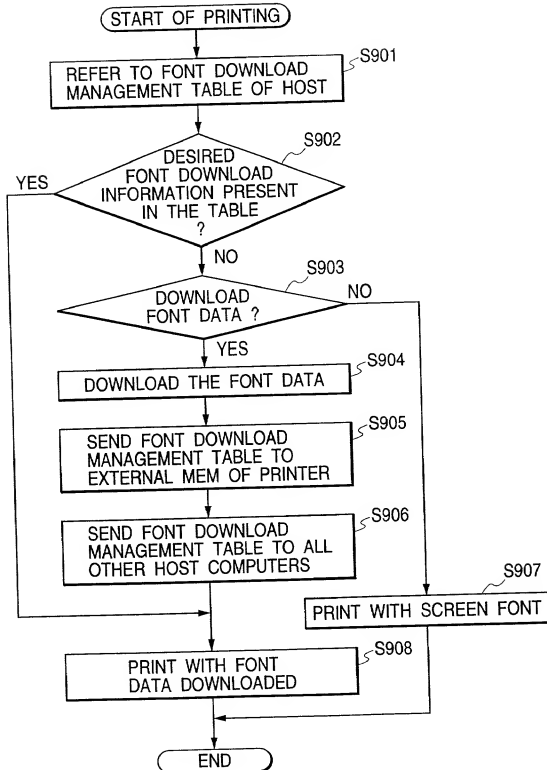


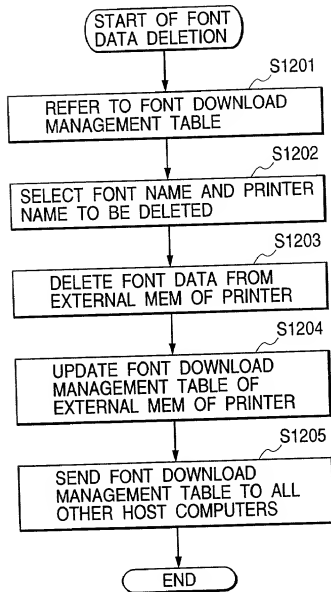
FIG. 12

FIG. 13

DIRECTORY
PROCESSING MODULES FOR FLOWCHARTS OF FIGS.3, 7 AND 10
PROCESSING MODULES FOR FLOWCHARTS OF FIGS.5, 8 AND 11
PROCESSING MODULES FOR FLOWCHARTS OF FIGS.6, 9 AND 12
• • • • •

**COMBINED DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION**
(Page 1)

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled _____

PRINT SYSTEM, PRINTING METHOD, AND STORAGE MEDIUM

the specification of which ☒ is attached hereto ☐ was filed on _____ as United States
Application No. or PCT International Application No. _____
and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or § 365(b), of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT international application which designates at least one country other than the United States, listed below and have also identified below any foreign application for patent or inventor's certificate, or PCT international application having a filing date before that of the application on which priority is claimed:

Country	Application No.	Filed (Day/Mo./Yr.)	(Yes/No) Priority Claimed
Japan	10-321363	October 28, 1998	Yes

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or § 365(c) of any PCT international application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 C.F.R. § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

Application No.	Filed (Day/Mo./Yr.)	Status (Patented, Pending, Abandoned)
N/A		

I hereby appoint the practitioners associated with the firm and Customer Number provided below to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and direct that all correspondence be addressed to the address associated with that Customer Number:

FITZPATRICK, CELLA, HARPER & SCINTO
Customer Number: 05514

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Inventor's signature _____

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